

CLAIMS

1. Proximity detector employing a capacitive sensor, comprising:

- 5 - at least one detection antenna comprising a plurality of capacitive proximity sensors, each comprising a measurement electrode, said antenna being placed close to an object or a body,
- electronic means for exciting said measurement electrodes  
10 and for processing the signals originating from said capacitive sensors,
- digital means for controlling the electronic means and for calculating, from the measurement signals thus processed, the distances between said electrodes and said object or said  
15 body,
- characterised in that the electronic means comprise, for each detection antenna, a floating capacitive bridge or with floating excitation, cooperating with polling means to measure sequentially the respective capacitances between each  
20 electrode of said antenna and the object or body to be measured.

2. Proximity detector according to claim 1, characterised in that the detection antenna also comprises a single shield for  
25 all the measurement electrodes of the antenna.

3. Proximity detector according to claim 1, characterised in that the detection antenna also comprises a number of shields each provided for a part of the assembly of measurement  
30 electrodes of the antenna.

4. Proximity detector according to one of the preceding claims, characterised in that the electronic means

and the digital control and calculation means cooperate to measure a distance successively on each electrode of an antenna according to a predetermined but changeable order.

- 5 5. Proximity detector according to one of the preceding claims, characterised in that at least one of its detection antennas comprises a test track which, in normal operation, is at the potential of the shield and, in test mode, is earthed.
- 10 6. Proximity detector according to claim 5, characterised in that the test track is placed to the rear of or close to the electrodes.
- 15 7. Proximity detector according to one of the preceding claims, characterised in that the electronic means and the digital control and calculation means cooperate to deliver an alarm signal indicating an inconsistent measurement or a malfunction of the digital control and calculation means.
- 20 8. Proximity detector according to one of the preceding claims, characterised in that the electronic means also comprise one or more reference capacitances provided to check the calibration of said electronic means or to recalibrate said electronic means.
- 25 9. Proximity detector according to one of the preceding claims, characterised in that one antenna also comprises, close to the measurement electrodes, one or more shield or earthing surfaces which are arranged to modify the field lines
- 30 of the measurement electrodes.

10. Proximity detector according to one of the preceding claims, characterised in that it is arranged on the inside or outside surface of a cap or box and comprises a plurality of measurement areas equipped with detection antennas.

11. Proximity detector according to one of the preceding claims, characterised in that the electronic means and the digital control and calculation means cooperate to deliver proximity detection threshold signals.

12. Proximity detector according to one of claims 10 and 11, characterised in that the electronic means and the digital control and calculation means cooperate to deliver analogue output signals of minimum distance images between the zones of the box and the objects detected.

13. Proximity detector according to one of claims 10 to 12, characterised in that the antennas are arranged on five faces of the box or cap.

14. Proximity detector according to one of claims 10 to 13, characterised in that it comprises edge antennas arranged in part over one face of said cap, and in part over another contiguous face, and lateral antennas.

15. Proximity detector according to one of the preceding claims, characterised in that at least one of the antennas is produced using a flexible circuit.

16. Proximity detector according to one of the preceding claims, characterised in that at least one of the antennas is connected to the electronic means by flexible connecting means.

17. Proximity detector according to one of the preceding claims, used in a piece of radiology equipment employing X-rays, comprising a device for emitting an X-ray beam intended to irradiate an object or a body and a device for detecting the X-rays originating from said object or body, this X-ray detector device being covered by a cap, characterised in that the detector is arranged on the inside or outside surface of said cap, in the X-ray emission field and in that it comprises at least one antenna, termed the X-ray antenna, crossed by the X-ray beam.

18. Proximity detector according to claim 17, characterised in that the X-ray antenna comprises a piercing provided for the passage of the X-ray beam.

19. Proximity detector according to claim 17, characterised in that the X-ray antenna is produced from a flexible printed circuit composed of an insulator metallised on both faces with a thin layer of chromium then by a layer of copper, said copper layer being removed over an area which corresponds to the passage of the X-ray beam and in which the linking tracks and the capacitive electrodes are produced from the chromium layer.

20. Proximity detector according to one of the preceding claims, fitted in a piece of radiology equipment employing X-rays, comprising a device for emitting an X-ray beam intended to irradiate an object or a body,

characterised in that it is arranged on the inside or outside surface of said emitter device.

21. Application of a proximity detector according to one of  
5 the preceding claims, for controlling a vascular positioner.

22. Application of a proximity detector according to one of  
claims 1 to 20, in a radiology machine, for checking the X-ray  
dose emitted on to an object or a body, starting from a  
10 calculation of the thickness of said object or body.

23. Application according to claim 22, in which the thickness  
of the object or body is calculated from distance  
measurements.  
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24. Application of a proximity detector according to one of  
claims 1 to 20, for checking the speed and/or position of a  
machine in motion, in particular a machine tool.

20 25. Application of a proximity detector according to one of  
claims 1 to 20, for detecting a complex shape or a presence.

26. Application according to claim 25, in which one or more  
proximity detectors according to one of claims 1 to 20 are  
25 installed in an item of equipment or a moving vehicle.

27. Application according to claim 25, in an anti-burglary  
detector.